Ranking Countries According to the Prices of Their Exports*

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PRELIMINARY AND INCOMPLETE
(Please Do Not Cite or Disseminate)

December 2003

Abstract

This paper ranks countries according to the prices their exports receive in the U.S. market. To the extent that these prices capture quality, the rankings correspond to positions along an international quality ladder. Changes in rankings between 1972 and 2001 reveal a number of interesting trends. First, countries at the top of the quality ladder are pulling away from those at the bottom over time. Second, several countries, notably Ireland and China, have sprinted up the ladder over time. Finally, the data reveal that .

Keywords: Product Trade; Quality Ladder; Export Unit Values
JEL classification: F1; F2; F4

*I thank Andrew Bernard and Benjamin Polak for insightful comments. This research is supported in part by the National Science Foundation (SES-0241474).

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1. Introduction

This paper exploits product-level U.S. international trade data to track the relative sophistication of countries' exports over time. Exports that receive higher prices within narrowly defined product categories are assumed to be vertically superior to exports that sell for less. I introduce two methodologies based on revealed preferences to aggregate price trends across goods into bilateral and overall international "quality"[1] ladder rankings. The main contribution of the paper is to show that the relative superiority of exports from more sophisticated countries is increasing with time. This divergence is consistent with the international specialization predicted by standard international trade models, which have countries adjusting the composition of their output and trade according to comparative advantage as trade barriers fall.

I begin by comparing countries bilaterally in terms of expenditure ratios. Each bilateral expenditure ratio divides the actual cost of one country's exports by the hypothetical cost of purchasing the same export bundle from the other country. A standard revealed-preference outcome would have U.S. consumers always purchasing imports from the cheaper of the two countries, with the result that bilateral expenditure ratios would all be less than one. That is not the case. Instead, I find that country-pairs generally exhibit "leader-follower" relationships: leader exports are *more* expensive when purchased from the leader, while follower exports are *less* expensive when purchased from the follower. Switzerland and India are a leader-follower pair in 1972: purchasing Switzerland's exports from Switzerland costs 1.6 times more than purchasing Switzerland's exports from India, while purchasing India's export quantities from India costs just 0.6 times as much as purchasing them from Switzerland. Surprisingly, 70 percent of country-pairs evince a leader-follower relationship between 1972 and 2001.

The "gap" between leaders and followers – i.e. the difference between leader and follower bilateral expenditure ratios – grows over time as leader export prices increase relative to those of followers. The evolution of this

[1] This ladder might be more accurately described as a 'sophistication' ladder than a 'quality' ladder (Grossman and Helpman 1991) because vertical differentiation may manifest either as higher quality (same attributes but more durable) or better features (same durability but added bells and whistles).

gap varies substantially across regions, offering insight into the relative ascendance of Asia over Latin America. Indeed, Asian leaders pull further ahead of their followers over time, while the opposite is true of leaders from Latin America. Asia is also adding leaders and subtracting followers over time, whereas the reverse is true of Latin America. All of these trends are robust to changes in the number of U.S. trading partners over time.

In the second part of my analysis aggregate annual country-pair rankings into an overall international quality ladder for each year. Countries ranks along the ladder are determined by the number of followers each country leads. Switzerland had more followers (46) than any other country in 1972, thereby placing it on the top rung of the ladder. Romania, on the other hand, led no other countries in that year earning it the lowest rung. Year-to-year rankings are highly correlated, but some countries experience substantial re-rankings between over the sample period. Macao, Hungary and Malaysia, for example, leap up the ladder while Brazil, Greece and Jamaica decline precipitously. Here, too, Asia outperforms Latin America: the average rank of Asian countries rises between 1972 and 2001 while the average rank of Latin America falls.

Changes in overall quality ladder rankings offer an alternate view of international specialization. Most importantly, I find that the distribution of follower countries per leader narrows over time as leaders with very many or very few followers disappear. This compression, in conjunction with evidence of a growing leader-follower gap, suggests that countries are converging along one dimension – the number of leader "victories" – even as they diverge along another – the "margin" of those victories.

The remainder of the paper is structured as follows. Section 2 discusses the theoretical basis of using export prices to rank countries. Section 3 discusses the international trade data upon which this exercise is based. Section 4 computes bilateral expenditure ratios for all U.S. trading partners. Section 5 details how the bilateral expenditure ratios are used to estimate an international quality ladder. Section 6 explores the robustness of country rankings. Section 7 concludes.

2. International Specialization

Exploiting export prices to gauge international specialization is appealing from a number of theoretical perspectives. Most directly relevant is the product cycle literature begun by Posner (1961) and Vernon (1966, 1979). The earliest product cycle models imagine leader and follower countries trading dominance over products through time: leaders invent and control the market for a product until followers succeed in copying the good, at which time – owing to their lower production costs – the followers take over.[2] In the quality ladder version of this model (Grossman and Helpman 1991), this cycling takes place within rather than across products via vertical differentiation: as followers reverse engineer one variety of a product, leaders develop and release a newer, more sophisticated version that sells for a higher price. Recent research by Schott (2004) indicates that U.S. trade data are more easily interpreted through the lens of quality ladders because even the most and least developed U.S. trading partners increasingly export the same products to the United States, albeit at significantly different prices.

Using within-product export prices as a signal of vertical product differentiation is also consistent with the factor proportions framework, which has capital- and skill- abundant countries exporting relatively capital- and skill-intensive products compared with the exports of labor-abundant countries.[3] Indeed, the factor proportions framework is often used to motivate the respective abilities of leader and follower countries in the product cycle literature.

Finally, ranking countries in terms of within-product prices also relates to a rich literature, begun by Balassa (1965), which uses countries' industry participation to estimate their revealed comparative advantage. Countries whose relative exports of labor-intensive industries are high compared with the relative exports of other countries, for example, are said to have a revealed comparative advantage in labor. Here, I use prices within products

[2] Feenstra and Rose (2000) estimate a quality ladder in terms of the pattern of countries entry into U.S. import industries between 1972 and 1994. They demonstrate a positive correlation between their rankings and GDP growth over time.

[3] Schott (2004) finds that export prices are positively correlated with exporting country capital and skill abundance and with the capital intensity of exporter production techniques.

rather than product or industry participation to identify specialization. One benefit of this approach is that it helps mitigate the effect of aggregation bias associated with the examination of coarser, industry-level data.

3. Data

Product-level U.S. import data available from the U.S. Census and compiled by Feenstra et al. (2002) record the customs value of all U.S. imports by source country (alternately "exporters" or "trading partners") from 1972 to 2001. Imports are recorded according to thousands of finely detailed product categories.[4] Table 1 lists the countries included in the analysis while Table 2 summarizes the product categories by one-digit Standard International Trade Classification (SITC1) industries. As indicated in Table 2, SITC1 industries 0 through 4 contain natural resource products, industries 5 through 8 capture manufacturing goods and industry 9 catches idiosyncratic products that are not elsewhere classified. Two manufacturing industries, Manufactured Materials (SITC1 6), which includes textiles, and Miscellaneous Manufactures (SITC1 8), which includes apparel, account for the largest share of products. In this paper I focus exclusively on manufacturing products (i.e., products in SITC1 industries 5 through 8) in order to focus on the effects of countries' skill and capital abundance and technological sophistication, rather than their resource abundance.

The product-level trade data include information on both quantity and value for many goods and countries, rendering possible the calculation of product unit values. I compute the unit value, or "price", of product p from country c, u_{pc}, by dividing import value (V_{pc}) by import quantity (Q_{pc}), $u_{pc} = V_{pc}/Q_{pc}$.[5] Examples of the units employed to classify products include dozens of shirts in apparel, square meters of carpet in textiles and

[4] Imports are classified according to seven digit Tariff Schedule of the US (TS7) codes from 1972 through 1988 and according to the ten digit Harmonized System (HS10) codes from 1989 through 1994. The most salient difference between the two systems is a reduction in the number of Manufactured Materials categories at the expense of Machinery, Chemical and Food categories.

[5] For some years and products, there are multiple country observations of value and quantity. In those cases, I define the unit value to be a value-weighted average of the observations. Availability of unit values ranges from 77 percent of product-country observations in 1972 to 84 percent of observations in 1994.

pounds of folic acid in chemicals. As noted above, I assume that unit value premia within product categories are a signal of vertical product differentiation. I aggregate unit value premia across products and countries to rank U.S. trading partners along an international quality ladder. The intuition and algorithms behind this ranking are outlined in the next two sections.

Use of U.S. trade data to compare countries assumes that countries' exports to the U.S. accurately reflect the prices they would receive in alternate markets. This assumption is partially justified by the relative openness of the U.S. economy and its attractiveness as an export destination. Nevertheless, the existence of tariff and non-tariff barriers, as well as more general trade costs, can be influential in determining which of a country's goods are exported to the United States. Unfortunately, comparable product-level trade data for other countries are unavailable.

Unit values are noisy.[6] To dampen this noise, I trim the sample along two dimensions before comparing trading partners. This trimming is performed on a country-pair-product level dataset. First, I drop observations where the relative quantity or the relative price of the country pair is either below the 10th percentile or above the 90th percentile of all observations. Second, I drop observations when the number of products exported in common by the country pair is below the 10th percentile. The first trim gets rid of unrealistic unit values, while the second gets rid of unrealistic country comparisons. I refer to this base sample as the 10-90 sample; unless otherwise noted, all data samples and results to follow are from it.[7] I have compared the 10-90 sample to 1-99, 5-95 and 20-80 samples, where the name of a sample reflects the percentiles used to trim observations. Results using the 5-95 and 20-80 datasets are consistent with the base results reported in the paper.

In the analysis below, I compare results for three sets of countries. The

[6] A study by the U.S. General Accounting Office (1995) identified underlying product heterogeneity and classification error as two major sources of unit value error in an in-depth analysis of eight products. Vertical differentiation among trading partners is the basis for this paper. Classification error, i.e. inaccurate recording of units and misclassification of goods, is likely an important source of observations judged to be unreasonable.

[7] The number of country-pair-product observations in the 10-90 sample ranges from 406,570 in 1972 to 3,137,082 in 2001.

first set is the "full" sample of countries appearing in each year of the (10-90) dataset. The number of countries in this sample increases from 68 in 1972 to 86 in 2001.[8] The second, or "constant country", sample encompasses the constant set of 55 countries that appear in *every* year of the dataset. Countries in this sample are noted via capital letters in Table 1. I use this sample to control for changes in the composition of U.S. trading partners over time. The final sample is referred as the "constant leader-follower" sample. It includes the set of 427 country-pairs that exhibit a leader-follower pattern (defined below) in *both* 1972 and 2001. It is used to control for changes in the composition of leaders and followers over time. This last sample includes more countries (64) than the constant-country sample because it focuses on just the endpoints of the sample period; countries included in it are noted with an asterisk in Table 1.

The bilateral unit values I construct in the next section require that countries export some goods in common to the United States; obviously, if each country produces a unique set of goods, such a comparison is not possible. Figure 1 indicates that exporters' product-mix overlap is sizeable in 1972 and increases with time. The first line in the figure (left axis) reports that the average number of exporters per product increases more-or-less steadily from 10 to 18 between 1972 and 2001.[9] The second line (right axis) reports the mean number of products that country-pairs export in common to the United States. This average increases from 236 products in 1972 to 814 products in 2001, corresponding to 3.7 percent and 6.1 percent of all possible manufacturing product exports in each year, respectively.

4. Revealed Preferences and Bilateral Expenditure Ratios

Country pairs' positions on an international quality ladder can be recovered from revealed preferences. I compute U.S. consumers' preferences for the exports of each pair of trading partners, c and d, via bilateral ex-

[8] The number of potential U.S. trading partners is substantially higher than 86. The lower numbers here reflect the data trimming noted above. That trimming eliminated many of the smallest U.S. trading partners from the sample.

[9] This trend controls for the increase in potential U.S. trading partners over time (e.g. the dissolution of the Soviet Union) by being restricted to the set of exporters which exist in the data over the entire sample period.

penditure ratios (E^{cd}). Let E_t^{cd} be the ratio of actual U.S. expenditures on imports from country c in year t to the hypothetical cost of purchasing c's quantities from country d,

$$E_t^{cd} = \frac{\sum_p u_{pt}^c q_{pt}^c}{\sum_p u_{pt}^d q_{pt}^c}, \tag{1}$$

where u_{pt}^c and q_{pt}^c are the price (i.e. unit value) and quantity of manufacturing import product p in year t from country c. Values of E_t^{cd} greater than unity indicate that country c's exports could be (but were not) more cheaply sourced from country d, while $E_t^{cd} < 1$ indicates that country c's exports are more expensive if purchased from country d.

Figure 2 reports a matrix of E_i^{cd} for a subset of U.S. trading partners in 1972. Each cell of the matrix displays E_t^{cd} for row country c and column country d. Countries are identified by their three-letter World Bank country code and sorted by capital abundance in ascending order.[10] Empty cells reflect country pairs that export no common manufacturing goods to the United States in 1972, and cells are shaded if $E_i^{cd} > 1$. The diagonal of the matrix ($E_i^{cc} = 1$) is blacked out.

Figure 2 has two cells for each pair of countries: values below the diagonal are the E_t^{cd} for this pair, while values above the diagonal are the E_t^{dc} for this pair. The value 1.6 appearing in the (40,1) element of the matrix, for example, indicates that purchasing Switzerland's (CHE) export quantities from Switzerland costs 1.6 times more than purchasing them from India (IND). The (1,40) element of the matrix, on the other hand, reveals that purchasing India's quantities from India is just 0.6 times as expensive as purchasing them from Switzerland. This mixed result is based on the 444 products that Switzerland and India both export to the United States in 1972. It, like capital abundance, ranks India below Switzerland.[11]

[10] The data on real capital per worker used to sort countries in Figure 2 are drawn from the Penn World Tables (Mark 5.6) compiled by Summers and Heston [1995]. The subset of trading partners displayed in the figure is defined by the availability of these data.

[11] Across all the cells in Figure 2, the number of products each country-pair has in common ranges from 33 (Bolivia- Sweden) to 2303 (Japan-U.K.).

Forty percent of the cells displayed in Figure 2 exhibit $E_t^{cd} > 1$ and are therefore shaded. The concentration of this shading below the diagonal indicates that within country pairs, relatively high capital per worker is associated with relatively high-priced exports. An identical pattern is evident across time, as indicated by the results in Table 3, which reports mean E_t^{cd} by trading partners' relative capital abundance at ten-year intervals. These results are restricted to the 36 countries for which annual K/L data is available between 1972 to 1992, and they are unavailable for 2001 because Penn World Table capital stock data ends in 1992. The first and second rows of the table report the mean E_t^{cd} for country pairs where $K/L_c > K/L_d$ and $K/L_c < K/L_d$, respectively. For the matrix in Figure 2, these are the means of cells below and above the diagonal, respectively. As noted in the table, mean bilateral expenditure ratios in each year are significantly higher (p-values < 0.01) when $(K/L_c)/(K/L_d) > 1$.[12]

I compute E_t^{cd} and E_t^{dc} for all pairs of U.S. trading partners with exports in common between 1972 and 2001. As in Figure 2, three outcomes are possible: E_t^{cd} and E_t^{dc} are both less than unity; one ratio is greater than unity while the other is less than unity (a "mixed" or "leader-follower" result); or E_t^{cd} and E_t^{dc} are both greater than unity.

The first outcome ($E_t^{cd} < 1$ and $E_t^{dc} < 1$) is consistent with a standard revealed preference outcome that has U.S. consumers purchasing imports from exporters with the lowest prices. A mixed result ($E_t^{cd} > 1$ and $E_t^{dc} < 1$, or $E_t^{cd} < 1$ and $E_t^{dc} > 1$), on the other hand, reveals that U.S. consumers are paying more than necessary for one country's bundle because the same bundle could be imported more cheaply from the other exporter in the pair. I assume these preferences reflect within-product vertical product differentiation that the product classification is too coarse to capture. The third possible outcome ($E_t^{cd} > 1$ and $E_t^{dc} > 1$) indicates that each countries' exports could be more cheaply sourced from the other country in the pair. This outcome is difficult to explain. It is relatively unimportant

[12] Over time, the distribution of expenditure shares are influenced by three factors: changes in the number of country pairs with overlapping exports; changes in the number of overlap products for a given pair of exporters; and changes in how products are classified. Though Table 3 controls for the first influence by focusing on a constant set of exporter pairs, the ability to control for the remaining two influences is more limited.

empirically.[13]

Mixed results yield clear bilateral quality-ladder rankings: if $E_t^{cd} > 1$ and $E_t^{dc} < 1$, then leader country c is further up the ladder than follower country d. Note that countries can be both leaders and followers across countries pairs: Germany may lead Argentina even as Argentina leads China, in which case Argentina appears as a follower in the first country pair and a leader in the second. Note also that bilateral expenditure ratios need not lead to a complete ranking of countries: in the previous example, it is possible empirically that China lead Germany or that China and Germany have no exports in common. In the next section, I introduce a methodology for forming a complete ranking of countries according to the number of followers each country leads.

Figure 3 provides an annual breakdown of country pairs according to the relationship of their bilateral expenditure ratios. Mixed observations are most prevalent, comprising an average of 70 percent of country-pairs across the sample period. Observations of both $E_t^{cd} < 1$ and $E_t^{dc} < 1$ are about half as prevalent, averaging 29 percent between 1972 and 2001. As indicated in the figure, a rise in country pairs exhibiting $E_t^{cd} < 1$ and $E_t^{dc} < 1$ beginning in the late 1980s is matched by a decline in mixed observations. Observations where both bilateral expenditure ratios are greater than unity decline more-or-less steadily from 4.4 percent in 1972 to 0.7 percent in 2001.

Bilateral expenditure ratios and their evolution over time indicates that leaders are pulling away from followers and that Latin America is being squeezed from above and below by Asia and Europe, respectively. Though Figure 3 indicates that the share of country-pairs exhibiting a clear leader-follower relationship declines with time, the distance between leaders and followers among such country pairs is rising. For leader country l and follower country f, define the leader-follower distance within a country pair as

$$D_t^{lf} = E_t^{lf} - E_t^{fl}. \tag{2}$$

[13] Cells are outlined in Figure 2 if both E_t^{cd} and E_t^{dc} are greater than unity (e.g. Turkey-Morocco in cells (7,2) and (2,7)). Across the entire dataset, country pairs where both bilateral expenditure ratios are greater than unity have a disproportionately high presence of relatively small exporters. They also have on average less than half the number of products in common as country pairs otherwise classified.

Table 4 reports the reports the average D_t^{lf} for 1972 and 2001 for the full, constant-country and constant leader-follower samples.[14] In all three cases, D_t^{lf} is significantly larger (p-values < 0.01) in 2001 than in 1972. The gap is largest for the full sample of countries (row 1) because it incorporates the entry of new, smaller trading partners in later years that are more likely to be followers. The result for the constant leader-follower sample (row 3) is significant because it reveals that the gap between leaders and followers is growing even when controlling for changes in the composition of leaders and followers over time.[15]

Leader-follower gaps evolve differently across regions and highlight the relative ascendance of Asia. Let

$$\Delta D^l = \underset{f}{\text{mean}} \left(D_{2001}^{lf} - D_{1972}^{lf} \right) \tag{3}$$

be the mean change in leader l's distance from its followers between 1972 and 2001, and

$$\Delta D^f = \underset{l}{\text{mean}} \left(D_{2001}^{fl} - D_{1972}^{fl} \right) \tag{4}$$

be the mean change in follower f's distance from its leaders between 1972 and 2001. Table 5 reports the average ΔD^l and ΔD^f by region across the 427 country pairs of the constant leader-follower sample. The first two columns list the regions and the number of countries in each region. (Regional affiliations are reported in 1.) Asia, Europe and Latin America include a relatively large number of countries and are therefore highlighted. The remaining five regions contain 4 or fewer countries. The third and fifth columns of the table report the number of country pairs with leaders and followers from each region, respectively. Europe, unsurprisingly, defines the largest number of leader-follower pairs (290), followed by Asia (51). Asia, on the other hand, has the largest number of followers (197), followed by Latin America (112). Note that because this table summarizes the

[14] As noted in Section 3., the constant country sample encompasses the 55 countries that are present in *every* year of the dataset, while the constant leader-follower sample captures the 427 country-pairs exhibiting the same leader-follower relationship in both 1972 and 2001. Table 1 identifies the countries in all three samples.

[15] Unfortunately, controlling for changes in product composition between 1972 and 2001 is not possible. As noted above, the classification system used to track U.S. imports changed in 1989.

constant leader-follower sample, the number of country pairs from each region is constant over time.

The fourth and sixth columns of Table 5 show that leaders from Asia and Central Europe[16] are pulling the furthest ahead of their followers over time, while followers from these two regions and North America[17] are falling the least far behind. These columns also reveal that the lead of Latin America and the Caribbean leaders is shrinking, and that followers from these two regions are falling relatively further behind than the average country over time.[18]

Changes in the number of leaders and followers from each region reinforce the message that Asia climbed over Latin America between 1972 and 2001. Table 6 reports the percent change in each region's leader and follower country pairs over the sample period for the larger, constant-country sample. The first three columns reveal that Asia and Latin America have roughly the same number of countries in the sample (15 versus 13) and begin the sample period defining roughly the same number of leader country pairs (103 versus 106). Column four, however, shows that by 2001 the number of country pairs with an Asian leader nearly doubles (to 183) while the number with a Latin American leader falls (to 99). Results with respect to followers are similar. The last three columns of the table demonstrate that the number of country pairs with an Asian follower declines (378 to 279) while the analogous number for Latin America increases (205 to 257).

5. Constructing an International Quality Ladder from Bilateral Expenditure Ratios

In this section I introduce a methodology for constructing a complete ranking of U.S. trading partners using the bilateral expenditure ratios from the last section.

Inspection of shaded cells in Figure 2 reveals that ranking countries according to capital abundance is not identical to ranking them in terms of export prices. Iran (IRN) in row 10, for example, has more followers

[16] The three Central European countries are Hungary, Poland and Romania.

[17] The one North American country is Canada.

[18] Note that $\text{mean}(\Delta D^l) = -\text{mean}(\Delta D^f)$ because the average distance by which leaders get ahead must equal the average distance by which followers fall behind.

(shaded cells) than the countries around it, while New Zealand (NZL) in row 32 has considerably fewer. Elevating Iran and demoting New Zealand would increase shading under the diagonal, thereby forming an overall ranking that is more consistent with the distribution of export prices. If the rows and columns in Figure 2 were re-sorted according to leader-follower relationships, the share of shaded cells under the diagonal would increase 5%, to 63%.

Let R_t^c be the number of followers led by exporter c in year t,

$$R_t^c = \sum_d I\{E_t^{cd} > 1 \text{ AND } E_t^{dc} < 1\}, \tag{5}$$

where $I\{\cdot\}$ is an indicator function taking on the value of unity if the expression in braces is true.

Table 7 reports 1972 and 2001 international quality ladders based on R_t^c for the 55 countries in the constant-country sample. The first and third columns of the table indicate countries' ranks in each year, while the second and fourth columns list the countries by their World Bank codes, noting each country's R_t^c in parentheses. Countries with the same R_t^c share the same rank and rest on the same rung of the ladder. I also display country ranks via a scatterplot of 2001 versus 1972 R_t^c in Figure 4. This scatterplot has the virtue of rendering large changes in countries' ranks more visible: countries substantially below a hypothetical 45 degree line running through Poland (POL) and Japan (JPN) have slid relatively far down the ladder over time, while the reverse is true of countries substantially above it.

Several countries' ranks change substantially between 1972 and 2001. Ireland (IRL), for example, moves from the 14th rung of the ladder in 1972 to the top rung in 2001. Other developing countries with relatively big movements up the ladder include Macao (MAC)[19], Peru (PER), Hungary (HUN), Malaysia (MYS), China (CHN) and the Philippines (PHL). Countries experiencing relatively large drops include Jamaica (JAM), Brazil (BRA) and Greece (GRC). Overall, countries with relatively high ranks in 1972 tend to fall over time while those with relatively low ranks tend to rise.

[19] Trade with Macau, like that with Hong Kong, is recorded seperately from trade with China due to its colonial history. Hong Kong and Macau became a special administrative regions (SARs) of China in 1997 and 1999, respectively.

Close inspection of Figure 4 reveals that the fewer countries exhibit either very high or very low values for R_t^c in 2001 than in 1972.[20] This impression is reinforced by the dotplots in Figure 5, which report the distribution of R_t^c in 1972 and 2001.

Changes in R_t^c capture a different aspect of the evolving relationship between leaders and followers than the leader-follower gaps (ΔD^l) explored above. Indeed, whereas leader-follower gaps record the margin of leaders' victories, R_t^c summarizes the number of competitors beaten by each leader. Like ΔD^l, however, changes in R_t^c vary by region. Let ΔM^c be the change in the number of countries that country c dominates between 1972 and 2001,

$$\Delta M^c = R^c_{2001} - R^c_{1972}. \tag{6}$$

Table 8 reports the mean rank of countries by region in 1972 and 2001 as well as each region's average ΔM^c. The average Asian country begins the sample period ranked below the average Latin American country (36 versus 33), but finishes it ranked ahead (27 versus 36). Indeed, Asia's average rank rises as Latin America's average rank falls. Furthermore, as revealed in the final column of the table, Asian countries beat an average of 3.4 (i.e. 5.3 - 1.9) more countries over time than the average country, while Latin American countries beat 2.4 (i.e. -0.5 - 1.9) fewer.

6. Conclusion

I use export prices to rank countries bilaterally and in aggregate along an international quality ladder. I find that the vertical differentiation of more highly-ranked countries' exports is increasing relative to that of lower-ranked countries over time. This trend is consistent with the product-mix specialization implied by standard trade theory, which has developed and developing economies reallocating production and trade toward comparative advantage as trade barriers fall.

Export prices also reveal the relative ascendance of Asia over Latin America. Latin America has fewer international quality ladder leaders, and the lead of the leaders it does have is declining with time. Asian

[20] This narrowing of the distribution of dominance is a manifestation of the decline in the share of leader-follower country pairs noted in the previous section.

leaders, by contrast, begin the sample period behind Latin America but finish in front of it. This performance mirrors broader measures of its success.

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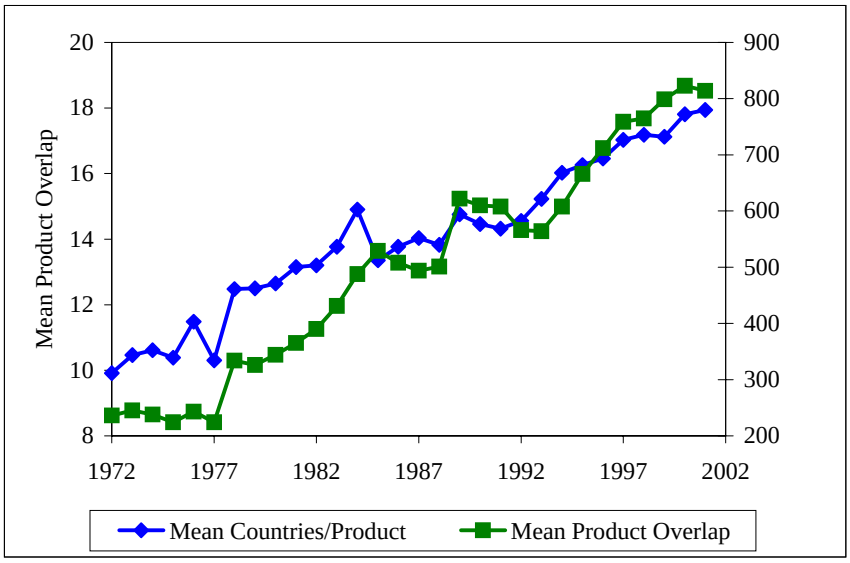


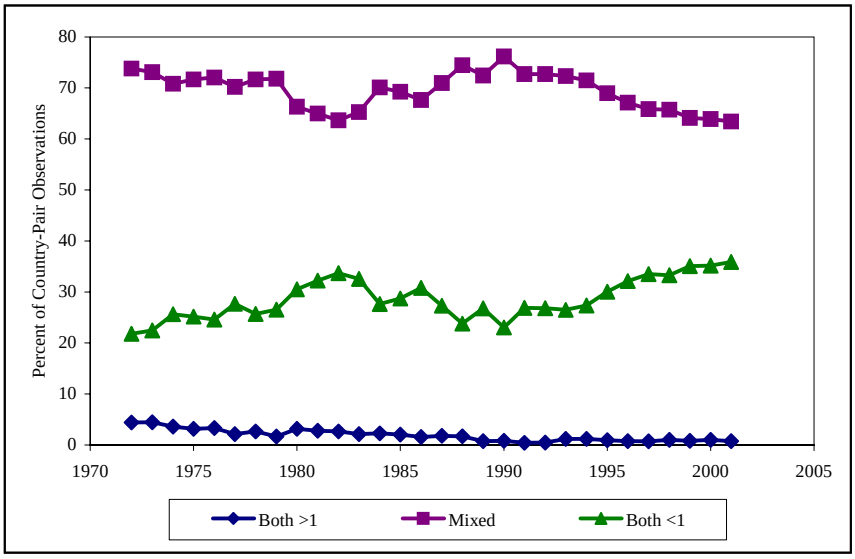
Notes: Left axis is the mean number of source countries per manufacturing import in the raw dataset. This trend is based on the set of trading partners which exist over the entire sample period. Right axis is the mean number of products exported in common to the U.S. across all country pairs with at least one product in common. Product overlap is computed from the 1090 data sample (see text).

Figure 1: Mean Countries per Manufacturing Import and Mean Country-Pair Product Overlap, 1972-2001

i		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	IND		0.8	1.0	0.9	1.0	1.2	0.7	0.9	0.8	0.5	0.7	0.8	0.9	1.0	0.7	1.1	0.8	0.9	0.8	0.4	0.8	0.5	0.5	0.6	0.6	0.8	0.7	0.5	1.2	0.6	0.7	0.8	0.5	0.7	0.8	0.3	0.7	0.6	0.7	0.6
2	MAR	1.1		1.1		0.8	1.0	1.0		1.6	0.8		1.1	0.9				1.0	1.1	0.8	0.6	0.8	0.8	1.0	0.7	0.7		1.1	0.7	0.7	0.8	0.9		0.8	0.7	0.8	0.8		0.7	0.8	0.7
3	THA	1.0	0.9			1.2	0.9	0.7		0.8	0.6		1.0	0.8		0.5		0.8	0.9	0.6	0.4	0.5	0.6	0.5	0.8	0.4		0.5	0.4	0.4	0.4	1.3		0.3	0.5	0.8	0.4	1.1	0.9	0.3	0.4
4	DOM	0.8					1.3			1.9			1.5	0.9				1.0	1.2	0.7	0.5	0.7	1.8	1.7	0.8	0.6		2.8	0.6	1.4	0.5	0.8		0.4	0.7	0.6		0.6	0.9	0.3
5	GTM	0.8	0.8	0.6			1.0			1.4			1.1	0.5				1.1	0.4	0.9	0.4	0.5	1.1	0.7	0.9	1.0		0.6	0.5	0.5	0.5	0.6		0.6	0.8	0.4	0.5		0.6		0.5
6	PHL	0.8	0.6	1.0	0.6	1.0		0.8		1.1	0.7	0.6	1.2	0.5		0.8	1.3	1.0	0.8	0.7	0.6	0.7	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.6		0.4	0.5	0.5	0.5	0.7	0.4	0.5	0.3
7	TUR	1.3	1.3	0.9		1.1				1.1	0.9		1.1	0.9		0.7		1.0	0.9	0.9	0.8	0.7	0.9	1.0	0.7	0.8		0.9	0.8	0.6	0.8	0.8		0.8	0.7	0.6	0.6	1.1	0.7	0.9	0.7
8	BOL	1.0											1.0	0.7				1.0		0.8	0.5	0.8	1.0	0.8	1.0	0.6		0.6	0.4	1.0	0.7			0.6	1.0	1.0			1.0		0.5
9	KOR	1.2	0.7	1.2	0.6	0.9	1.0	0.7			0.8	1.0	0.9	0.6	1.3	1.0	1.0	0.8	0.9	0.6	0.5	0.5	0.7	0.8	0.5	0.5	0.8	0.6	0.5	0.5	0.5	0.8	0.9	0.5	0.8	0.5	0.5	0.8	0.7	0.6	0.5
10	IRN	2.0	1.3	0.6			1.2	0.9		1.3			1.0	1.7				1.1	0.9	0.8	0.9	1.0	1.4	1.1	0.7	1.0		1.5	1.0	0.6	1.1	1.0		0.4	0.9	0.7	0.8	0.9	0.9	0.9	0.7
11	JAM	0.8					1.6			0.9			1.5	0.9				1.2	0.6	0.8	0.5	1.5	1.0	1.1	0.4	1.0		0.9	0.6	0.8	0.5	0.7		0.5	0.6	0.6	0.4	1.1	0.4	1.1	0.3
12	TWN	1.1	0.7	1.2	0.5	0.8	1.0	0.7	0.9	0.9	0.8	0.9		0.7	1.1	0.9	0.9	0.9	0.8	0.7	0.7	0.5	0.6	0.6	0.4	0.5	0.7	0.5	0.4	0.4	0.5	0.7	0.7	0.4	0.6	0.5	0.6	0.7	0.5	0.5	0.4
13	PRT	1.2	0.9	0.9	1.6	1.0	1.7	0.7	1.0	1.3	0.8	0.9	1.2		1.4	0.8	1.0	1.1	1.0	0.9	0.9	0.8	0.7	0.8	0.5	0.8	0.7	0.8	0.7	0.5	0.8	0.8	0.8	0.7	0.8	0.7	0.6	1.0	0.7	0.7	0.6
14	PER	1.0								0.9			1.0	0.6				1.0	1.1	1.0	0.5	0.9	0.9	0.5	1.0	0.4		0.7	0.4	0.9	0.8	0.9		0.4	0.9	1.0	1.1	1.0	0.8	0.9	1.0
15	ARG	1.1		2.5			1.9	1.2		0.8			1.1	0.7				1.1	1.2	1.0	0.8	0.9	0.8	0.7	0.6	0.6	0.7	0.8	0.6	0.7	0.9	0.6	1.1	0.6	0.8	0.6	0.5	1.1	0.7	0.9	0.4
16	ECU	0.9					1.1			1.2			1.2	0.5				0.7	1.1	1.0	0.7	0.8	1.2	0.6	0.7	0.5		0.6	0.8	0.7	0.5	0.9		0.8	0.7	0.5		0.8		0.4
17	HKG	0.9	1.2	1.1	0.8	0.8	1.0	0.8	1.3	1.0	1.0	1.0	1.0	0.8	0.9	0.6	1.6		0.9	0.8	0.8	0.6	0.6	0.8	0.5	0.5	0.8	0.6	0.5	0.4	0.6	0.5	0.7	0.5	0.7	0.5	0.5	0.6	0.5	0.7	0.4
18	COL	0.9	0.8	1.1	0.8	1.2	1.0	0.8		0.8	0.5	0.9	1.0	0.9	0.8	0.8	0.8	0.8		0.8	0.5	0.6	0.7	0.6	0.6	0.5	0.8	0.7	0.5	0.7	0.5	0.6	0.8	0.5	0.5	0.5	0.5	0.6	0.5	0.6	1.0
19	MEX	1.2	1.3	1.6	1.0	1.3	1.3	0.9	1.0	1.3	0.9	1.1	1.3	1.0	1.0	1.0	0.9	1.0	1.1		1.0	0.9	0.8	1.1	0.7	0.8	1.0	0.8	0.8	0.5	0.7	0.7	0.9	0.8	0.9	0.7	1.0	1.0	0.8	0.8	0.7
20	IRL	1.6	1.0	2.1	1.3	1.2	1.4	1.0	1.3	1.2	1.2	0.9	1.1	0.7	1.7	1.2	0.9	1.2	1.3	1.1		1.0	0.6	0.9	0.6	0.9	0.8	1.0	0.8	0.6	0.9	0.6	1.2	0.6	0.8	0.9	0.8	1.1	0.7	0.9	0.7
21	ESP	1.8	0.9	1.7	1.1	1.7	1.4	1.1	1.6	1.3	0.9	0.8	1.7	0.9	1.3	1.1	1.0	1.2	1.1	1.0	0.7		1.1	0.9	0.7	0.9	0.9	0.9	0.8	0.7	1.1	0.8	1.0	0.8	0.8	0.6	0.7	1.0	0.7	0.8	0.5
22	JPN	1.2	0.9	1.4	0.9	0.8	1.2	0.9	1.3	1.5	0.8	1.1	1.4	0.9	1.2	1.3	1.0	1.4	1.1	0.9	1.1	0.9		0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.9	1.0	0.7	0.8	0.8	0.9	0.9	0.7	0.7	0.5
23	GRC	1.5	1.1	1.0	0.6	1.4	1.6	1.1	0.8	1.2	1.0	0.9	1.3	1.1	1.3	1.3	1.4	1.1	1.3	0.9	0.8	1.1	1.1		0.8	0.8	0.9	1.2	1.0	0.8	0.9	1.0	0.7	1.0	0.9	0.7	0.5	1.2	0.8	0.8	0.5
24	GBR	1.7	1.3	1.9	1.6	1.8	1.6	1.2	1.3	1.2	1.2	1.4	1.5	0.9	1.2	1.2	1.1	1.4	1.9	0.9	0.9	1.1	1.2	1.0		0.9	0.9	0.8	0.9	1.0	0.9	0.7	1.0	0.8	0.9	0.8	1.0	1.0	0.8	0.8	0.9
25	AUT	1.3	1.6	1.2	1.7	1.4	1.8	1.1	1.6	1.3	0.9	1.3	1.4	0.8	1.5	0.9	1.2	1.4	1.6	0.7	0.9	1.0	1.1	0.9	0.8		1.0	1.1	0.9	0.7	0.8	0.9	1.3	0.8	0.9	0.9	1.1	1.1	0.9	0.8	0.6
26	VEN	1.3					1.7			1.2			1.4	1.0		1.1		1.2	1.1	0.8	1.1	1.2	1.0	0.8	0.8	1.1		1.0	0.8	0.5	0.8	0.9		0.8	0.8	0.8	0.5	1.1	0.9	0.7	0.5
27	ISR	1.3	1.2	1.5	1.1	1.7	1.7	0.9	1.2	1.3	0.9	1.8	1.3	1.1	1.2	1.0	1.0	1.2	1.1	1.0	1.0	0.8	1.0	1.0	0.9	0.7	0.5		0.7	0.9	0.7	0.8	1.1	0.6	0.9	0.7	0.6	0.9	0.7	0.6	1.0
28	ITA	1.5	1.2	1.7	1.6	1.2	1.5	1.2	2.4	1.6	1.3	1.7	1.8	1.2	1.6	1.1	2.0	1.4	1.7	1.1	1.0	1.1	1.1	1.0	0.9	0.9	1.1	1.3		0.8	1.0	1.0	1.0	0.8	0.9	0.8	0.8	1.1	0.8	0.9	0.6
29	FRA	1.6	1.7	1.3	1.4	1.2	2.0	1.2	0.9	1.4	1.5	1.3	1.4	1.1	1.2	1.2	1.2	1.5	1.6	0.9	1.1	1.1	1.1	1.1	1.0	0.9	1.0	1.3	1.0		1.0	1.1	1.0	0.8	1.0	0.9	0.9	1.2	0.9	0.9	0.7
30	DNK	1.2	1.0	1.3	1.1	2.0	1.7	1.3	1.7	1.3	1.3	1.7	1.6	0.8	1.2	0.8	0.7	1.0	1.3	0.9	1.0	1.0	1.1	1.0	0.8	0.9	0.6	1.0	0.9	0.8		0.9	0.7	0.9	0.9	0.9	0.8	0.8	0.9	0.7	0.7
31	NLD	1.4	0.9	1.1	1.3	1.3	1.1	1.1		1.2	0.9	1.4	1.3	0.8	1.1	1.2	1.1	1.2	1.4	0.9	0.9	1.1	1.0	0.9	0.9	0.9	1.3	1.1	0.9	0.9	0.9		1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.0	0.7
32	NZL	0.9								1.0			1.0	0.8		0.9		0.8	0.7	1.0	0.9	1.0	0.9	0.9	1.0	1.0		0.9	0.7	0.8	0.8	0.9		0.8	1.0	0.6	0.9	1.1	0.9	0.6	0.7
33	SWE	1.4	1.3	1.0	1.0	1.6	1.8	1.3	1.5	1.3	1.3	1.3	1.3	1.1	1.5	1.1	0.7	1.1	1.1	1.1	1.0	1.1	1.4	1.1	1.2	0.8	0.8	1.0	1.1	1.1	0.8	0.9	1.0		1.1	1.1	1.0	0.8	1.0	1.1	0.8
34	BEL	1.2	0.9	1.3	0.8	1.0	1.4	1.2	1.3	1.2	1.0	1.0	1.2	1.1	1.1	1.1	1.1	1.2	1.4	1.0	0.8	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.0	1.0	0.9	0.9	1.1	0.8		0.8	1.0	1.1	0.9	1.1	0.8
35	CAN	1.1	1.4	1.5	1.5	1.8	1.5	1.1	1.1	1.3	1.6	1.6	1.3	1.2	1.1	1.3	1.3	1.0	1.4	1.0	0.9	0.9	1.0	1.1	1.0	1.0	0.9	1.0	0.8	0.9	1.0	1.2	0.8	1.0		1.2	1.1	0.9	1.0	0.6
36	FIN	1.4	2.5	1.2		1.5	1.7	1.6		1.4	1.1	1.0	1.5	1.1	0.8	1.2		1.2	1.0	0.9	1.2	1.0	1.0	1.0	1.0	0.8	1.4	1.1	0.8	0.9	1.0	1.0	0.7	0.8	1.0	0.9		0.9	0.9	0.9	0.8
37	AUS	1.1		1.4			1.1	1.2		1.0	0.9	0.9	1.0	0.8	1.0	0.9		0.9	1.2	1.1	0.7	1.0	1.0	1.0	0.9	0.9	0.8	0.9	0.8	0.8	0.8	1.0	0.9	0.7	0.9	0.6	1.2		0.8	1.0	0.9
38	DEU	1.4	1.5	1.5	1.2	1.2	1.7	1.3	2.0	1.3	1.1	1.2	1.6	1.3	1.3	1.2	1.1	1.4	1.6	1.0	1.0	1.2	1.2	1.0	1.1	0.9	1.0	1.1	1.1	1.0	1.0	0.8	1.0	0.9	1.2	1.2		0.8	0.8
39	NOR	1.3	1.2	1.0	1.5		1.1	1.1		1.6	1.0	1.1	1.7	1.5	1.2	1.2		1.3	1.3	0.9	1.2	1.3	0.8	1.4	1.0	0.7	1.0	1.0	0.7	0.8	1.2	1.1	0.7	0.9	1.1	1.0	1.1	1.0		0.6
40	CHE	1.6	1.7	1.4	1.4	1.4	1.7	1.6	1.4	1.4	1.0	1.7	1.6	1.1	1.2	1.3	1.7	1.4	1.2	1.0	1.1	1.3	1.3	1.2	1.2	0.8	1.4	1.1	1.0	1.0	1.1	1.1	1.4	1.1	1.1	1.2	1.0	1.1	1.0	0.9	

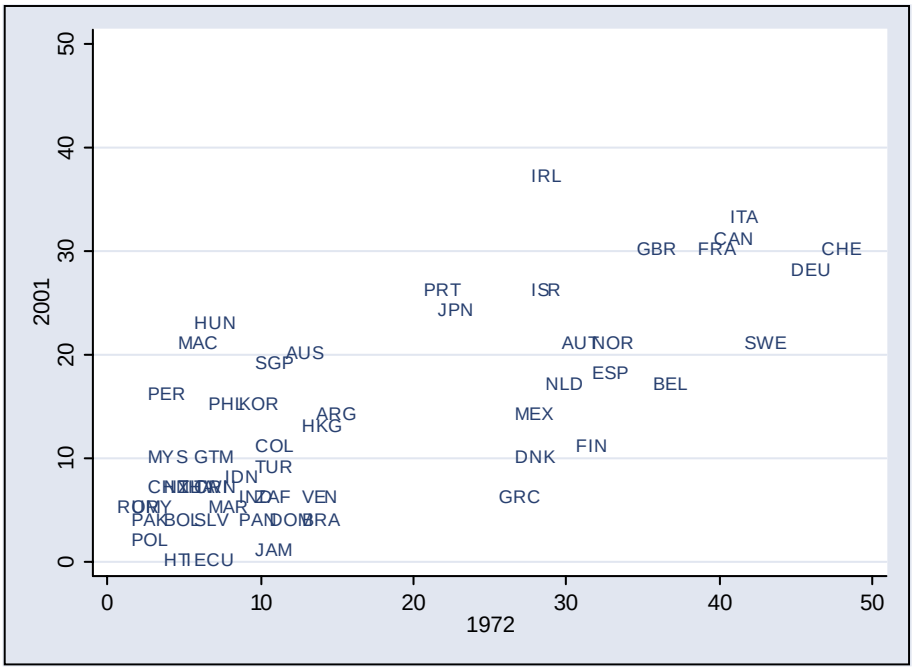
Notes: Each cell reports a bilateral expenditure ratio (E^{cd}) for row country c and column country d for a sample of U.S. trading partners in 1972. Countries are sorted in terms of their real capital per worker in ascending order; capital-labor ratios are from Penn World Tables Mark 5.6. Cells are shaded if $E^{cd}>1$ and cells are outlined if both $E^{cd}>1$ and $E^{dc}>1$.

Figure 2: Bilateral Expenditure Ratios (E_t^{cd}) for a Subset of U.S. Trading Partners, 1972



Notes: Figure displays a breakdown of bilateral expenditure share ratios by year. Both>1 indicates that $E^{cd}>1$ and $E^{dc}>1$. Mixed indicates that one of the expenditure share ratios is greater than unity while the other is less than unit. Both<1 indicates that $E^{cd}<1$ and $E^{dc}<1$.

Figure 3: Breakdown of Country-Pair Observations According to E^{cd} and E^{dc}, by Year



Notes: Figure displays number of countries dominated by each country (R^c) in 1972 and 2001. Domination of more countries is associated with being higher up the international quality ladder. Rankings restricted to the constant set of 55 countries that are present in every year of the sample.

Figure 4: 1972 versus 2001 R^c, by Country

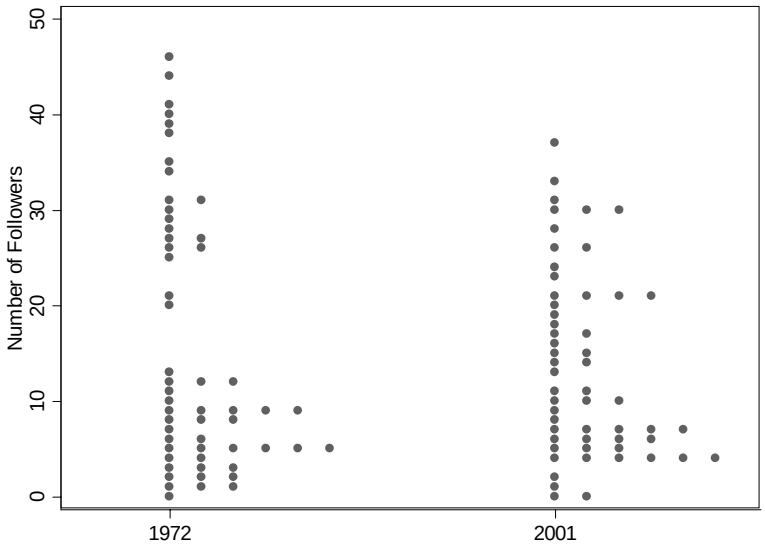


Figure 5: 1972 and 2001 Distribution of Followers Per Country

Country	Code	Region	Country	Code	Region	Country	Code	Region
afghanistan	afg	as	gibraltar	gib	eu	nigeria	nga	af
albania	alb	eu	GREECE*	GRC*	EU*	NORWAY*	NOR*	EU*
algeria	dza	af	greenland	grl	na	oman	omn	me
american samoa	asm	as	guadeloupe	glp	car	PAKISTAN*	PAK*	AS*
angola	ago	af	GUATEMALA*	GTM*	LA*	PANAMA*	PAN*	LA*
ARGENTINA*	ARG*	LA*	guinea	gin	af	papua new guinea	png	as
AUSTRALIA*	AUS*	AS*	guinea-bissau	gnb	af	paraguay	pry	la
AUSTRIA*	AUT*	EU*	guyana	guy	la	PERU*	PER*	LA*
bahamas	bhs	car	HAITI*	HTI*	CAR*	PHILIPPINES*	PHL*	AS*
bahrain	bhr	me	honduras	hnd	la	POLAND*	POL*	CEU*
bangladesh	bgd	as	HONG KONG*	HKG*	AS*	PORTUGAL*	PRT*	EU*
barbados*	brb*	car*	HUNGARY*	HUN*	CEU*	qatar	qat	me
BELGIUM*	BEL*	EU*	iceland*	isl*	eu*	ROMANIA*	ROM*	CEU*
belize	blz	la	INDIA*	IND*	AS*	rwanda	rwa	af
benin	ben	af	INDONESIA*	IDN*	AS*	saudi arabia	sau	me
bermuda	bmu	na	iran	irn	me	senegal	sen	af
BOLIVIA*	BOL*	LA*	IRELAND*	IRL*	EU*	seychelles	syc	af
BRAZIL*	BRA*	LA*	ISRAEL*	ISR*	ME*	sierra leone	sle	af
bulgaria	bgr	ceu	ITALY*	ITA*	EU*	SINGAPORE*	SGP*	AS*
burkina faso	bfa	af	JAMAICA*	JAM*	CAR*	somalia	som	af
burundi	bdi	af	JAPAN*	JPN*	AS*	SOUTH AFRICA*	ZAF*	AF*
cambodia	khm	as	jordan	jor	me	SPAIN*	ESP*	EU*
cameroon	cmr	af	kenya*	ken*	af*	sri lanka	lka	as
CANADA*	CAN*	NA*	kiribati	kir	as	st. kitts and nevis	kna	car
cen aft rep	caf	af	KOREA*	KOR*	AS*	sudan	sdn	af
chad	tcd	af	kuwait	kwt	me	suriname	sur	la
chile	chl	la	lao	lao	as	SWEDEN*	SWE*	EU*
CHINA*	CHN*	AS*	lebanon*	lbn*	me*	SWITZERLAND*	CHE*	EU*
COLOMBIA*	COL*	LA*	liberia	lbr	af	syrian *	syr*	me*
congo	cog	af	MACAO*	MAC*	AS*	TAIWAN*	TWN*	AS*
COSTA RICA*	CRI*	LA*	madagascar	mdg	af	tanzania	tza	af
cote d'ivoire	civ	af	malawi	mwi	af	THAILAND*	THA*	AS*
cyprus	cyp	me	MALAYSIA*	MYS*	AS*	togo	tgo	af
czech republic	cze	ceu	mali	mli	af	trinidad *	tto*	car*
DENMARK*	DNK*	EU*	malta*	mlt*	eu*	tunisia	tun	af
djibouti	dji	af	mauritania	mrt	af	TURKEY*	TUR*	ME*
DOM REP*	DOM*	CAR*	mauritius	mus	af	uae	are	me
ECUADOR*	ECU*	LA*	MEXICO*	MEX*	LA*	uganda	uga	af
egypt*	egy*	af*	mongolia	mng	as	UK*	GBR*	EU*
EL SALVADOR*	SLV*	LA*	MOROCCO*	MAR*	AF*	URUGUAY*	URY*	LA*
eq. guinea	gnq	af	mozambique	moz	af	VENEZUELA*	VEN*	LA*
ethiopia	eth	af	myanmar	mmr	as	viet nam	vnm	as
fiji	fji	as	nepal	npl	as	yemen	yem	me
FINLAND*	FIN*	EU*	neth antilles	ant	car	yugoslavia	yug	ceu
FRANCE*	FRA*	EU*	NETHERLANDS*	NLD*	EU*	zaire	zar	af
gabon	gab	af	new caledonia	ncl	as	zambia	zmb	af
gambia, the	gmb	af	NEW ZEALAND*	NZL*	AS*	zimbabwe	zwe	af
GERMANY*	DEU*	EU*	nicaragua*	nic*	la*			
ghana	gha	af	niger	ner	af			

Notes: Upper case indicates that the country it is included in the constant-country sample (see text). Asterisk indicates that the country is included in the contant leader-follower sample (see text). Regions: AF=Africa; AS=Asia; CAR=Carribean; CEU=Central Europe; EU=Europe; LA=Latin America; ME=Middle East; and NA=North America (except Mexico).

Table 1: United States Trading Partners, 1972-2001

SITC1 Industry	SITC2 Examples	Product Examples	Number of Products
0 Food	Meat, Dairy, Fruit	Live Sheep	1858
1 Beverage/Tobacco	Wine, Cigarettes	Carbonated softdrinks	177
2 Crude Materials	Rubber Cork, Wood, Textile Fibers	Silkworm cocoons suitable for reeling	811
3 Mineral Fuels	Coal, Coke, Petroleum	Uleaded gasoline	96
4 Animal/Vegetable Oils	Lard, Soybean Oil	Edible tallow	81
5 Chemicals	Organic Chemicals, Dyes, Medicines, Fertilizer, Plastics	Chloroform	2038
6 Manufactured Materials	Leather, Textile Yarn, Paper, Steel	Diaries and address books of paper or cardboard	4378
7 Machinery	Generators, Computers, Autos	Ultrasonic scanning apparatus	3113
8 Misc Manufacturing	Apparel, Footwear, Scientific Equipment	Boy's shorts cotton playsuit parts, not knit	3718
9 Not Elsewhere Classified	Special Transactions, Coins, Gold	Sound recordings for State Department use	87

Table 2: Description and Number of Products by SITC1 Industry, 2001

Relative K/L	1972	1982	1992	2001
Mean E^{cd} if $K/L_i < K/L_j$	0.79	0.74	0.66	na
Mean E^{cd} if $K/L_i > K/L_j$	1.14	1.07	1.10	na
Number of Trading Partners	36	36	36	na
Country Pairs	551	587	612	na
Mean Product Overlap	354	595	1017	na

Notes: Table displays mean bilateral unit value ratio (E^{cd}) across country pairs according to their relative capital abundance. Sample is comprised of the 36 countries for which Penn World Table Mark 5.6 K/L data are available in each year. The difference between means in the first and second row are statistically significant at the 1% level in each year. Note that with 36 trading partners there are 630 possible bilateral comparisons. The forth row of the table indicates the number of country pairs sharing at least one product. The fifth row displays the mean number of products exported in common across country pairs.

Table 3: Bilateral Expenditure Ratios and Country-Pair Relative Capital Abundance at Ten-Year Intervals, 1972-1992

Sample	Year	Number of Countries	Number of Country Pairs	Mean D^{lf}	Std Err D^{lf}
Full	1972	68	972	0.64	0.01
	2001	86	1723	0.85	0.01
1972-2001 Change				0.21***	
Constant Country	1972	55	852	0.67	0.01
	2001	55	750	0.75	0.01
1972-2001 Change				0.08***	
Constant Leader-Follower Pairs	1972	64	427	0.75	0.02
	2001	64	427	0.87	0.02
1972-2001 Change				0.12***	

Notes: Full sample includes all countries in the sample. Constant 55 sample includes countries that show up in every year of the sample. Constant leader-follower sample includes only the 427 country pairs that exhibit a mixed result in both 1972 and 2001. Third and fourth columns record the number of countries and country pairs in each sample. Final two columns report mean leader-follower distance (D^{lf}) and the standard error from a t-test of a difference in means. *** indicates mean difference is statistically different from zero at the 1% level.

Table 4: 1972 versus 2001 Leader-Follower Distances

Region	Number of Countries	Leader Country Pairs	Mean Change in Leader-Follower Distance (ΔD^l)	Follower Country Pairs	Mean Change in Follower-Leader Distance (ΔD^f)
Africa	4	1	0.13	17	-0.25
Asia	15	51	0.33	197	-0.06
Carribean	5	1	-0.05	34	-0.22
Central Europe	3	5	0.78	32	0.18
Europe	18	290	0.10	16	-0.08
Latin America	14	23	-0.08	112	-0.20
Middle East	4	23	-0.06	17	-0.41
North America	1	33	0.04	2	-0.01
Total or Mean	64	427	0.11	427	-0.11

Notes: Sample restricted to the constant set of 427 country pairs that exhibit a leader-follower relationship in both 1972 and 2001. Second column reports the number of countries from each region. Third and fifth columns report number of country pairs defined by leaders and followers from each region, respectively. Fourth and sixth columns report mean change in leader-follower and follower-leader distances across countries in each region. Final row reports sum of columns two, three and five, and means of columns four and six.

Table 5: 1972 versus 2001 Leader-Follower Distances by Region

Region	Number of Countries	Country Pairs with Leader From Region 1972	2001	% Change 72-01	Country Pairs with Follower From Region 1972	2001	% Change 72-01
Africa	2	15	11	-27	23	31	35
Asia	15	103	183	78	378	279	-26
Carribean	3	22	5	-77	50	84	68
Central Europe	3	6	30	400	75	40	-47
Europe	16	525	356	-32	89	42	-53
Latin America	13	106	99	-7	205	257	25
Middle East	2	36	35	-3	28	10	-64
North America	1	39	31	-21	4	7	75
Total or Mean	55	852	750	-12	852	750	-12

Notes: Sample restricted to the constant set of 55 countries present in every year of the dataset. Second column reports number of countries in each region. Third and fourth columns report the number of country pairs led by countries from each region in 1972 and 2001, respectively. Fifth and sixth columns report the same information for followers. Final row reports sum of columns two, three, four, six and seven, and the means of columns five and eight.

Table 6: 1972 versus 2001 Leaders, by Region

1972		2001	
1	CHE (46)	1	IRL (37)
2	DEU (44)	2	ITA (33)
3	SWE (41)	3	CAN (31)
4	ITA (40)	4	GBR (30)
5	CAN (39)		FRA (30)
6	FRA (38)		CHE (30)
7	BEL (35)	7	DEU (28)
8	GBR (34)	8	ISR (26)
9	NOR (31)		PRT (26)
	ESP (31)	10	JPN (24)
11	FIN (30)	11	HUN (23)
12	AUT (29)	12	AUT (21)
13	NLD (28)		MAC (21)
14	IRL (27)		SWE (21)
	ISR (27)		NOR (21)
16	DNK (26)	16	AUS (20)
	MEX (26)	17	SGP (19)
18	GRC (25)	18	ESP (18)
19	JPN (21)	19	NLD (17)
20	PRT (20)		BEL (17)
21	ARG (13)	21	PER (16)
22	VEN (12)	22	PHL (15)
	HKG (12)		KOR (15)
	BRA (12)	24	ARG (14)
25	AUS (11)		MEX (14)
26	DOM (10)	26	HKG (13)
27	JAM (9)	27	FIN (11)
	TUR (9)		COL (11)
	ZAF (9)	29	DNK (10)
	COL (9)		GTM (10)
	SGP (9)		MYS (10)
32	IND (8)	32	TUR (9)
	KOR (8)	33	IDN (8)
	PAN (8)	34	NZL (7)
35	IDN (7)		CRI (7)
36	MAR (6)		CHN (7)
	PHL (6)		THA (7)
38	SLV (5)		TWN (7)
	ECU (5)	39	GRC (6)
	GTM (5)		IND (6)
	TWN (5)		VEN (6)
	HUN (5)		ZAF (6)
	CRI (5)	43	URY (5)
44	THA (4)		ROM (5)
	MAC (4)		MAR (5)
46	BOL (3)	46	SLV (4)
	HTI (3)		BRA (4)
	NZL (3)		DOM (4)
49	MYS (2)		PAN (4)
	CHN (2)		BOL (4)
	PER (2)		PAK (4)
52	URY (1)	52	POL (2)
	PAK (1)	53	JAM (1)
	POL (1)	54	HTI (0)
55	ROM (0)		ECU (0)

Table 7: 1972 and 2001 International Quality Ladder Rankings

Region	Number of Countries	Mean Rank in 1972, 2001	Mean 1972 to 2001 Change in Follower Countries (ΔM^c)
Africa	2	31 / 41	-2.0
Asia	15	36 / 27	5.3
Carribean	3	33 / 51	-5.7
Central Europe	3	48 / 35	8.0
Europe	16	9 / 13	-10.6
Latin America	13	33 / 36	-0.5
Middle East	2	20 / 20	-0.5
North America	1	5 / 3	-8.0
Total or Mean	55	-	-1.9

Notes: Sample restricted to the 55 countries in the constant-country sample. Second column reports number of countries in each region. Third column reports average rank of countries in 1972 and 2001; higher ranks indicate lower positions on the quality ladder. Fourth column reports mean change in the number of dominated countries between (ΔM^c) 1972 to 2001.

Table 8: Mean Normalized Change in Dominated Countries, by Region